BUREAU OF INDIAN STANDARDS

भारतीय मानक मसौदा

फुटवियर इनसोल के लिए चमड़ा बोर्ड – विशिष्टि

(पहला पुनरीक्षण)

Draft Indian Standard

LEATHER BOARD FOR FOOTWEAR INSOLE — SPECIFICATION

(*First Revision*)

(ICS 59.140.01)

Leather, Tanning Materials and Allied Products, CHD 17	**Last Date for Comments**: **02/04/2024**

FOREWORD

(*Formal clause shall be added later*)

Leather board is a type of fibrous board having tanned or untanned leather or collagen fibre as its constituent. Its application is diverse but used mainly by footwear, leather goods, and travel goods industries. The leather board as a footwear component should be of an appropriate grade and quality, which has to render desired functional properties to the wearer, provided the footwear is correctly designed and constructed. Conversely, it should have adequate constituents or substances to meet the requirement. The leather board generally is more economical than leather.

This standard was originally published in 1970. The committee, while reviewing IS 5867:1970 decided to revise the standard keeping in line with the recent development that has taken place in the field and made following modifications in the standard

a) Condition clause have been added;
b) Physical requirements have been modified;
c) Test method have been updated.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022. 'Rules for rounding off numerical values (*second revision)'* The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard

Draft Indian Standard

LEATHER BOARD FOR FOOTWEAR INSOLE — SPECIFICATION

1 SCOPE

This standard prescribes the requirements and the methods of sampling and tests for leather boards for footwear insoles.

Boards containing only cellulose fibre, sometimes known in the trade as leather boards are not part of this standard.

2 REFERENCES

The Indian Standards listed in Annex A contain provision, which through reference in this text constitute provisions of this Indian Standard. At the time of publication, by editions indicated were valid. All standards are subject to revision; investigate the possibility of applying the most recent editions of the Indian Standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard the definitions given in IS 1640 shall apply.

3.1 Leather board — Technically a typical leather board is defined as "Scraps of leather ground in the form of pulp and mixed with bonding materials like rubber latex and made into a sheet." The leather scraps may be of tanned, untanned leather, or a combination of collagen fibre

4 TYPES

Depending upon the percentage of leather fibre content, there shall be two types of leather boards, namely**:**

Type 1 —Containing minimum 25 percent of leather forming material.

Type 2 —Containing minimum 50 percent of leather forming material

5 CONDITIONING

Conditioned the leather board sample at a standard temperature of (27±2)°C and (65±5) percent or (23±2)°C and 50±5 percent for 48 hours before testing**.**

6 MANUFACTURES GUIDE (RECOMMENDED)

Leather boards should be of tanned (Chrome/Vegetable) or untanned collagen fibres as the raw materials in the manufacture of insoles. Manufacturers shall realise the leather boards as a product from a suitable mixture of chopped long and short fibrous materials. The fibres need to be ground to uniform particle size, bleached, and bonded with latex or synthetic binders to obtain high quality insole boards. Adding stabilizers, colouring matter, and coagulants in beating operation during the manufacturing process gives rise to insole boards with desired end use properties.

6.1 Fungicidal Additives — During manufacture, suitable fungicide additives will be incorporated into the leather boards to prevent mould growth upon storage and use. The leather board material shouldn't show any growth of mildew when examined visually.

6.2 Cutting — Leather board shall be cut clean. It shall be of square pattern. The dimensions shall be subject to agreement between the purchaser and the supplier. All cut edges shall be free from loose fibres and dust.

6.3 Appearance — The leather board shall be smooth and flat. Both sides of the board shall be clean and free from loosely bound fibres.

7 REQUIREMENTS

7.1 Thickness —The thickness of the leather board shall be as agreed to between the purchaser and the supplier.

When measured according to the method LP:2 of IS 5914 the tolerance on agreed thickness shall be ± 0.1 mm. The variation of thickness in an individual board shall be not more than ± 0.1 mm

7.2 Physical Requirements — The material shall comply both Type 1 and Type 2 Leather board with the physical requirements as given in Table 1.

Table 1 Physical Requirements for Leather Board (Type 1 and Type 2)

(*Clause* 7.2)

Sl. No	**Characteristics**	**Requirement**			**Test Method**
		Category 'A' (*see* Note 1)	**Category 'B'** (*see* Note 2)	**Category 'C'** (*see* Note 3)	
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
i.	Wet tensile strength, N/mm^2,*Min*	7.0	6.0	4.0	Annex 'B'
ii.	Flexing Index,*Min*	3.7	3.2	2.7	Annex 'C'
iii.	Stitch tear strength, N/mm,*Min*	70	60	50	ISO 20876:2018
iv.	Transverse tensile strength, N/mm^2,*Min*	0.60	0.50	0.40	Annex 'D'
	a) Dry	0.50	0.35	0.20	
	b) Wet				
v.	Abrasion resistance, at 400 Cycles by Visual observation	Abrasion damage shall not be severe	Abrasion damage shall not be severe	Abrasion damage shall not be severe	IS 15298(Part 1)
vi.	Water absorption, mg/cm^2,*Min*	70	50	35	IS 15298(Part 1)
	Water Desorption, Percent,*Min*	80	70	45	
vii.	Surface Peel strength, N/mm,*Min*	0.5	0.5	0.5	Annex 'E'

NOTE

1 Category 'A'- Industrial and high quality footwear,
2 Category 'B'- Fashion and comfort shoe,
3 Category 'C'- Light use footwear

7.3 Chemical Requirements — The material shall comply with the chemical requirements calculated on 14 percent moisture basis, as given in Table 2.

Table 2 Chemical Requirements for Leather Board

(*Clause* 7.3)

Sl. No	Characteristics	Requirements		Test Method
		Type 1	Type 2	
(1)	(2)	(3)	(4)	(5)
(i)	Mineral ash, percent by weight, *Max*	2.5 in excess of Cr_2O_3 Content	2.5 in excess of Cr_2O_3 Content	IS 582 Part 3:2017 IS 582 (Part 10/Sec 1):2022
(ii)	Water soluble matter, percent by weight, *Max*	5	5	IS 582 Part 2:2018
(iii)	Leather forming material (calculated as hide substance on the material), *Min*	25	50	IS 582 Part 12:2022

8 PACKING AND MARKING

8.1 The boards shall be securely and suitably packed as agreed to between the purchaser and the supplier

Each package shall be marked with the following information:

a) Description of the material including type and category;
b) Thickness/weight per sheet and size of sheet;
c) Batch number; and
d) Manufacturer's name and recognized trade-mark, if any.

8.2 BIS CERTIFICATION MARKING

The product may also be marked with Standard Mark.

8.2.1 The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act*, 2016 and the rules and regulations framed there under, and the products may be marked with the standard mark.

ANNEX A
(*Clause* 2**)**
LIST OF REFERE INDIAN STANDARDS

IS No.	*Title*
IS 582	Methods of chemical testing of leather
Part 2:2018	Determination of water - Soluble matter, water Soluble inorganic matter and water - Soluble organic matter
Part 3: 2017	Determination of sulphated total ash and sulphated water - Insoluble ash (*Second Revision*)
Part 10	Determination Of Chromic Oxide Content
Sec 1:2022	Quantification By Titration
Part 12:2022	Determination Of Nitrogen Content And Hide Substance Titrimetric Method
IS 1640 : 2007	Glossary of terms relating to hides, skins and leather (*First Revision*)
IS 5914 : 1970	Methods of physical testing of leather
IS 15298 Part 1 : 2015	Personal Protective Equipment Part 1 Test Methods for Footwear (*Second Revision*)
ISO 20876 : 2018	Footwear — Test methods for insoles — Resistance to stitch tear

ANNEX – B

(Table 1, Item (i))

WET TENSILE STRENGTH OF LEATHER BOARD INSOLE

B-1 SCOPE

This method is intended to determine the tensile properties of insole materials, the force required to break the material. This method is applicable to semi rigid flexible leather board insole material for footwear application.

B-2 PRINCIPLE

A dumb-bell shaped test specimen is gradually stretched, by a tensile testing machine, until it fails. The tensile strength of the specimen is determined. The test can be carried out with either dry or wet specimens

B-3 APPARATUS AND MATERIALS

B-3.1 At ensile testing machine with ajawse parathion rate of (100±10)mm/min and a force will be less than 5KN for footwear insole and capability of measuring the force to an accuracy of better than 2%.

B-3.2 A press knife or other means of cutting dumb-bell shaped test specimens dimensions given in Figure1.

B-3.3 Thickness gauge which applies a pressure of (49 ± 5) kPa over a circular area of diameter (10 ± 1) mm, and is capable of measuring to the nearest 0.01 mm.

B-3.4 A device for measuring distances up to 25mm to the nearest 0.1mm. A vernier calliper is suitable.

B-4 PREPARATION OF TEST SPECIMEN

B-4.1 Storetheuncutsheetmaterialinastandardcontrolledenvironmentofeither (23±2)˚C and (50 ± 4) Percent RH for at least 48 hours before cutting out the test specimens and carry out the test in this environment.

B-4.2 Dry tensile cut six test specimens for with the dimensions shown in Figure 1, three with their longer edges parallel to the along direction of the material and three at 90° to this with their longer edges parallel to the across direction.

B-4.3 For wet tensile similarly cut separate six test specimens, three for the along direction and three for the across direction. Store the six test specimens for 6.0 ± 0.2 h in the distilled or deionised water so that they are fully immersed but not lying in contact with the vessel or other specimens. For each test specimen remove it from the water and gently press a soft absorbent cloth, or paper tissue, over its surfaces to blot away any excess water before testing.

B-5 PROCEDURE

B-5.1 Use the thickness gauge to measure the thickness of each test specimen, to the nearest 0.01mm, at the centre of the narrow portion and at two points on the long it udinalax is approximately 25mm on either side of the centre as given in Figure1.

B-5.2 Use the vernier calliper to measure the width of each test specimen, to an accuracy of 0.1 mm, across the centre of the narrow portion and through points approximately 25 mm on either side of the centre as given in Figure 1

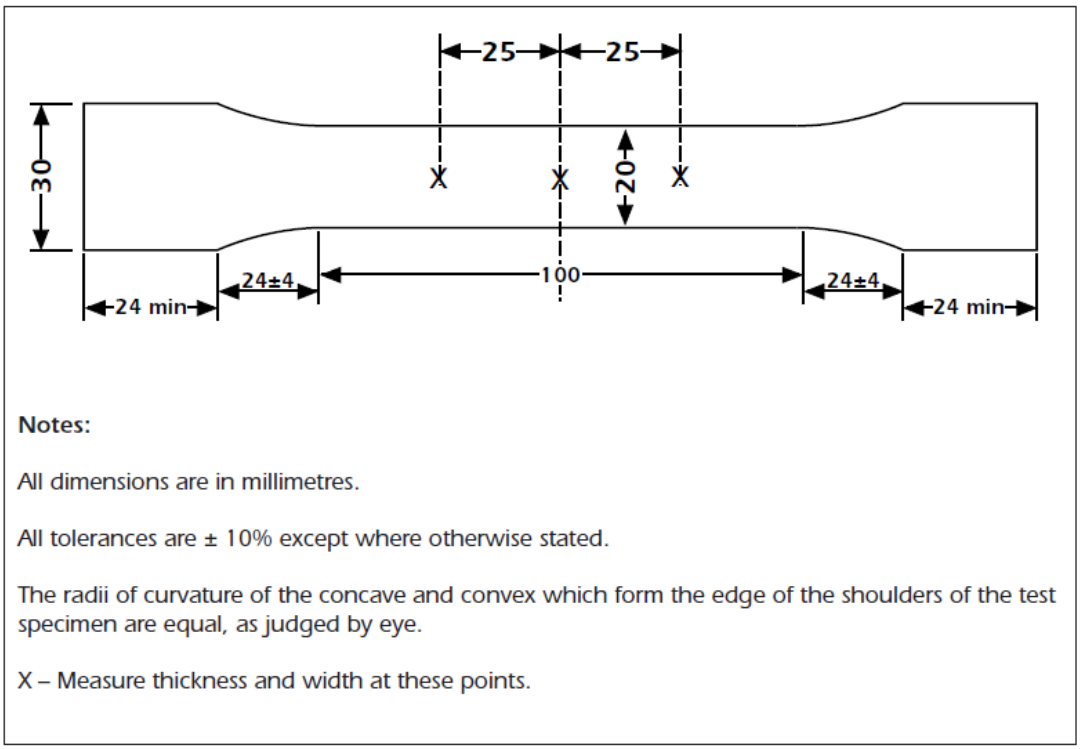

FIG 1. DUMB-BELL SHAPED TEST SPECIMEN

B-5.3 Adjust the tensile testing machine so that the jaws are approximately 150 mm a part.

B-5.4 Insert one end of a test specimen in each of the jaws of the tensile testing machine and clamp it, so that a similar area of the test specimen is clamped in each jaw.

B-5.5 Mark a line on the test specimen along the clamping edge of each jaw.

B-5.6 Operate the tensile testing machine so that the jaws separate at a speed of (100± 10) mm/min. Stop the machine when the test specimen break.

B-5.7 Record from the graph of force versus extension the breaking force in newton's, as [F],to the nearest5N.

B-5.8 Repeat the procedure in for the remaining test specimens for wet and dry tensile test.

B-5.9 For each test specimen calculate:

a) The mean of the three thickness [T] measurements.
b) The mean of the three width [W] measurements.
c) The cross sectional area in mm 2 using the formula: [A] = [T] x [W].
d) The tensile strength in MPa using the formula: [S] = [F]/ [A].

Calculate the mean tensile strength of the three test specimen cut in each direction for wet and dry test.

B-6 TEST REPORT

a) A description of the material,
b) Whether the specimens we retested we to rdry.
c) The mean tensile strength for wet and dry
d) Any devi

ANNEX- C

(Table 1, Item (ii))

FLEXING INDEX - LEATHER BOARD FOR FOOTWEAR APPLICATION

C-1 SCOPE

This method is to determine the endurance of a material to repeated flexing. The method is applicable to most type so semi-rigid sheet material of leather fibre boards.

C-2 PRINCIPLE

A specimen is held in tension and repeatedly flexed through 180° until failure occurs. The base10 logarithm of the number of flexing cycles to failure is calculated to give the flexing index of the material.

C-3 APPARATUS AND MATERIAL

C-3.1 A flexing machine with at least six pair so jaws, as shown in Figure, that each have one jaw with a taper angle of 76 ± 4 degrees and an internal tip radius of (0.8 ± 0.1) mm. A means of rotating the jaw cyclically under simple harmonic motion, about an axis which is projected from the jaw tips, between two points 90 ± 2degreeseach side of the vertical at a rate of (60 ±10) cycles per minute

C-3.2 A second jaw with a means of maintaining a standard tensional force on the test specimen of (19.6±0.1) new tons. A weight attached to the jaw so that a total mass of (2000±10) gissus pended from the test specimen is a convenient method of achieving this.

C-3.3 A method of counting the number of oscillations of the rotating jaw up to failure of the specimen.

C-3.4 A torque wrench of controlling the clamping force of the rotating jaw until it exerts a clamping force of (2.4 ± 0.4) kN on the test specimen.

C-3.5 A suitable machine as shown in fig 2 may be used.

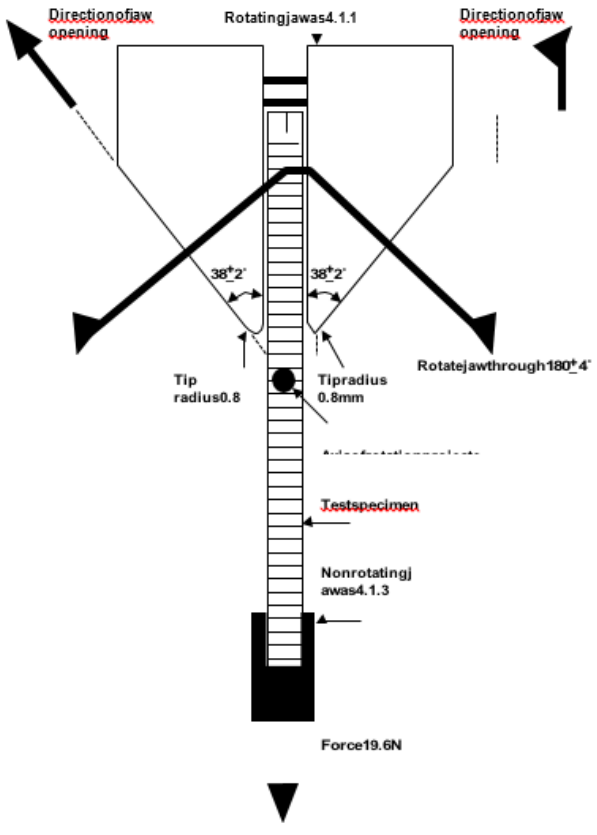

FIG 2: FLEXING GEOMETRY

C-4 Preparation of test specimen

C-4.1 Place the uncut sheet material into a standard controlled environment of either (23 ±2)°C/(50 ± 2) % for at least 48 hours. Include details of the conditions used in the test report.

C-4.2 Cut six rectangular test specimens, (70 ± 10) mm x (10.0 ± 0.1) mm, three with their length parallel to the principal or along direction of the material and three at 90° to this in the across direction.

C-5 Procedure

C-5.1 Ensure that the atmosphere surrounding the test machine is the standard controlled environment. Place each test specimen between a pair of jaws and on the flexing machine so that the longer edges of the specimen are perpendicular to the clamping edge of both jaws.

C-5.2 Tighten each rotating jaw until it exerts a clamping force of (2.4 ± 0.4) kN on the test specimen.This is achieved by adjusting a screw tightener to a torque of (2.5±0.4)N m.

C-5.3 For each non-rotating jaw apply a tensioning force of (19.6 ± 0.1)N to the jaw. Tighten the jaw onto a test specimen until it exerts a clamping force which is sufficient to prevent it slipping. The clamping force should not be unnecessarily high as this may damage the test specimen.

C-5.4 Operate the flexing machine and record the total number of flexing cycles as each specimen fails. When all the test specimens have failed stop the flexing machine.

C-5.5 For each test specimen, calculate the base10 logarithm of the total number of flexing cycles to failure.

C-5.6 Calculate the arithmetic mean of the logarithms for each of the principal directions of the material. These two values are termed the flexing indices.

C-6 Test report

a) A full description of the material.
b) The logarithm of the number of flexing cycles to failure for each test specimen, as calculated
c) The flexing index for each principal direction as calculated
d) Any deviations from this standard test method.

NOTE

Base 10 logarithms

The base 10 logarithm of a number is the power to which 10 needs to be raised to give the number. For example the base10 logarithm of 100 is 2 because 10^2 is 100, hence:

$$Y=10^{(\text{base10logarithmofY})}$$

Using logarithms to measure flexing endurance has the effect of compressing the range of values obtained for different materials. For example if material A has a flexing index which is 0.3 larger than material B then material A actually endured twice as many flexing cycles as material B.

ANNEX – D

(Table 1, Item (iv))

TRANSVERSE TENSILE STRENGTH FOR LEATHER BOARD FOR FOOTWEAR INSOLE

D-1 SCOPE

This method is intended to determine the transverse, Z direction, tensile strength of a material. The test is carried out with both wet and dry specimens. The method is mainly applicable to leather fibre-based or laminated materials, such as leather board insole materials for footwear, but can also be used with any type of sheet material used for footwear insole.

D-2 PRINCIPLE

Circular test specimens of the material are prepared and their surface area is measured. Circular metal plates are then attached by adhesive to the top and bottom faces of the specimens. Half of the specimens are soaked in distilled water, while the other half are kept dry. The plates are fitted into the jaws of a tensile testing machine and the force required to separate each specimen is measured.

D-3 APPARATUS AND MATERIALS

D-3.1 Tensile testing machine with jaw separation rate of 25 ±5 mm/min and a force will be 2kN and the capability of measuring the force to an accuracy better than 2%

D-3.2 Six pairs of circular metal plates of diameter greater than 38.9 mm but small enough to fit easily into the collar. The front face of the plates should be flat and at 90 degrees to the axis. The back face of the plates should have a means of fitting them in to the jaws of the tensile testing machine, and one jaw should be connected via a flexible mounting, as shown in the picture 1.

D-3.3 Picture 1- Test assembly of Leather board are attached between two metal plates and are fixed in the tensile testing machine

D-3.4 An annular collar with an internal diameter of less than 39.2 mm but large enough to fit easily over the plates. This is to keep the test specimen and plates coaxial while they are assembled. The height of the collar should be less than the combined height of a pair of plates.

D-3.5 A circular knife to cut out test specimens of diameter 37.9 ± 1.0 mm. If the taper angle of the blade's internal surface is about 5 degrees to the vertical, it is easier to remove the cut specimen from the knife without damage.

D-3.6 A press or similar device capable of exerting forces of up to 5.00 ± 0.25 kN on the plates and test specimen assembly.

D-3.7 Vernier callipers capable of measuring to an accuracy of 0.1mm.

D-3.8 A solvent borne polychloroprene (Neoprene) adhesive of the type used for sole attaching.

D-4 PREPARATION OF THE TEST SPECIMEN

Six circular discs of diameter 37.9 ± 1.0 mm, which are cut from sheet material which has been previously conditioned.

D-5 PROCEDURE

D-5.1 Place the uncut sheet material in a controlled standard environment of either 23 ±2°C/50 ± 4 Percent RH for 48 hours.

D-5.2 Using the circular knife cut six test specimens from the sheet material.

D-5.3 Measure the diameter (D) of each specimen in millimetres to the nearest 0.1 mm using the vernier calipers and calculate the area [A] of each specimen in square metres, using the formula as given:

$$\text{Area [A] mm}^2 = \text{Diameter [mm]} / 2 \times \text{Diameter [mm]} / 2 \times 3.14$$

D-5.4 Clean the front face of two metal plates to remove all pieces of board and adhesive from previous tests and any traces of grease. This is done by soaking in propa none (acetone) or butan-2-one (MEK).

D-5.5 Apply a coat of adhesive to the cleaned end faces of the plates and to both surfaces of the test specimen, and allow to dry for at least 20 minutes.

D-5.6 Place the collar over the end of one plate place the test specimen in the collar and press it lightly onto the plate face. Insert the cleaned end face of the other plate into the collar and lightly press the two plates together.

D-5.7 Place the assembly of the collar, the two plates, and the test specimen into the press and exert a load of 5.00 ± 0.25 kN between the back faces of the metal plates forapproximately10 seconds.

D-5.8 Remove the assembly from the press and carefully slide the collar off. Then repeat same procedure for the other five specimens.

D-5.9 Leave the six test assemblies in a standard controlled environment of either (23 ± 2) °C/ (50 ± 4) Percent RH for 24 hours.

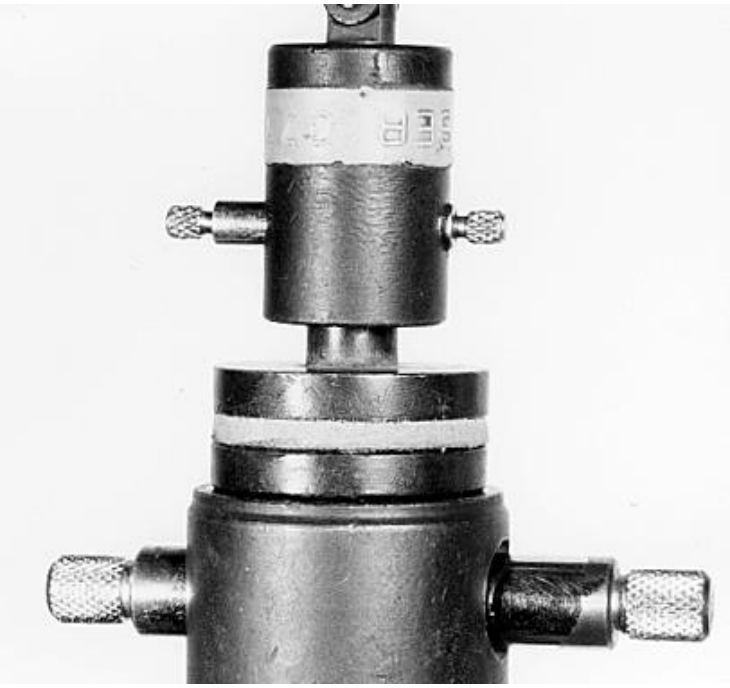

FIG 3. TEST ASSEMBLY OF LEATHER BOARD ARE ATTACHED BETWEEN TWO METAL PLATES AND ARE FIXED IN THE TENSILE TESTING MACHINE

D-5.10 Fit the first assembly in the tensile testing machine as shown in Picture 1and operate the machine with a jaw separation rate of (25 ± 5) mm/min. Record the maximum force [F] obtained, in newtons to the nearest 1N, and note the type of failure such as: failure within the material; failure of the material surface; failure of the adhesive bond. Repeat the procedure with two other test assemblies for dry test.

D-5.11 Soak the remaining three test assemblies in distilled or deionised water for six hours. Remove them from the water and immediately repeat the same procedure as said earlier for wet test assemblies.

D-5.12 If any of the test assemblies shows signs of failure of the adhesive bond between the plate and the test specimen then reject the results for that specimen and repeat the test with a new specimen.

D-5.13 For each specimen, divide the maximum force (F) recorded by the specimen area as calculated by using formula.

Transverse tensile strength [TTS] in N/mm^2= Force [F] / Area [A]

D-5.14 Then calculate the arithmetic means of the tensile strengths of the dry and the wet specimens.

D-6 Test report

a) Details of the material tested.
b) The mean transverse tensile strengths as calculated.
c) The type of failure.
d) Any deviations from this standard method.

ANNEX E

(Table 1, Item (vii))

SURFACE PEEL STRENGTH OF LEATHER BOARD INSOLE

E-1 SCOPE

This method is intended to determine the peel strength of the surface of a leather insole material. The method is mainly applicable to leather board / fibreboard for footwear insole materials, but can also be used with any type of semi-rigid sheet material.

E-2 PRINCIPLE

One surface of a test specimen is bonded to a piece of footwear upper leather with a strong adhesive. The force required to peel the test specimen from the leather, leaving its surface attached to the leather is measured with a tensile testing machine.

E-3 APPARATUS AND MATERIALS

E-3.1 A tensile testing machine having continuous recording force with a jaw separation rate of (100 ±20) mm/min and the capability of measuring forces up to 1kN, to an accuracy of 2 Percent.

E-3.2 A rapid acting platen press with the capability of applying a pressure of at least 200 kPa on an area of 70 mm x 50 mm. If no platen press is available, most test assemblies can be bonded by pressure applied by a hand roller.

E-3.3 A radiant heater unit capable of heating a dry adhesive film on upper leather to (80-90) °C. The commercial equipment for heat reactivating soles and uppers in footwear production is suitable.

E-3.4 A method of checking that the temperature of the adhesive film is within the range (80-90°)C. Heat sensitive crayons, preferably with a melting temperature of 83°C.

E-3.5 Chrome tanned upper leather of thickness (1.5 ± 0.2) mm. This should be either a suede split, buffed or lightly roughed, or a grain leather from which the whole of the grain layer has been removed by wire brush roughing so that its surface peel tear strength is greater than that of the test specimen.

E-3.6 A single part sole attaching, or general purpose, polychloroprene /neoprene adhesive which will bond well to leather and the surface of the test specimen.

E-3.7 A press knife or other cutting device capable of cutting rectangular test specimens of dimensions (70 ±1) mm x 50 ±1mm.

E-3.8 A cutting device such as a sharp knife, rotary disc cutter or press knife for cutting the test specimens from the bonded assemblies.

E-4 PREPARATION OF TEST SPECIMEN

E-4.1 Store the uncut material to be tested in a standard controlled environment to (23 ± 2)˚C/ (50±4) Percent RH for a minimum of 24 hours prior to cutting.

E-4.2 Use the knife to cut from the sheet material to be tested four rectangular pieces 70±1mmx (50±1)mm; two with their shorter edges parallel to the along direction, and two with their shorter edges parallel to the across direction.

E-4.3 For each piece of material cut in, mark an arrow on each half of the surface which is not to be tested so that the arrow head is pointing in the along direction of the material.

E-5 PROCEDURE

E-5.1 Cut a rectangular piece of leather 70 ± 1 mm x 50 ± 1 mm for each piece of material. If the setting of the radiant heater unit needs to be checked then cut one or two additional pieces of leather.

E-5.2 Place a strip of paper approximately 75 mm x 15 mm onto the surface of each piece of material which is to be tested so that it is aligned with one of the longer edges. Attach the paper strips with a staple at each end so that the staples are less than 5 mm from the 50mmedges of the material as shown in figure 1

E-5.3 Use a soft brush to apply the polychloroprene adhesive to the whole area of the prepared surface of each piece of leather.

E-5.4 Allow the adhesive to dry for approximately 30 minutes then repeat the procedure to apply a second coat of adhesive.

E-5.5 Use a soft brush to apply the polychloroprene adhesive to the surface of each rectangular piece of test material. Start all brush strokes on the paper strip and continue onto the test material taking care to ensure that no adhesive gets under the edge of the paper.

E-5.6 Allow all final adhesive coats to dry for at least 1 hour, but ensure that bonding is completed on the same working day.

E-5.7 Carefullyandquicklyplacetheadhesivecoatedsurfaceofapieceoftestmaterialin contact with the heated adhesive coat on the piece of leather, so that the edges of both surfaces area ligned. This will subsequently be referred to as at estassembly.

E-5.8 Place the test assembly into the platen press so that the leather is upper most and apply a pressure of at least 200kPa to the assembly for a few seconds. Alternatively hand pressure may be applied for a few seconds by using the roller to make several traverses of the leather surface.

E-5.9 Store the bonded test assemblies in an atmosphere of (23 ± 2)˚C / (50 ± 4) Percent RH for at least 24 hours.

E-5.10 For each bonded assembly, cut an equal amount from the shorter edges of the assembly to produce an assembly of width (60 ± 1) mm. Cut the remaining central portion in half to produce two test specimens of width (30.0 ± 0.5)mm and length approximately 50mm as shown in figure 4.

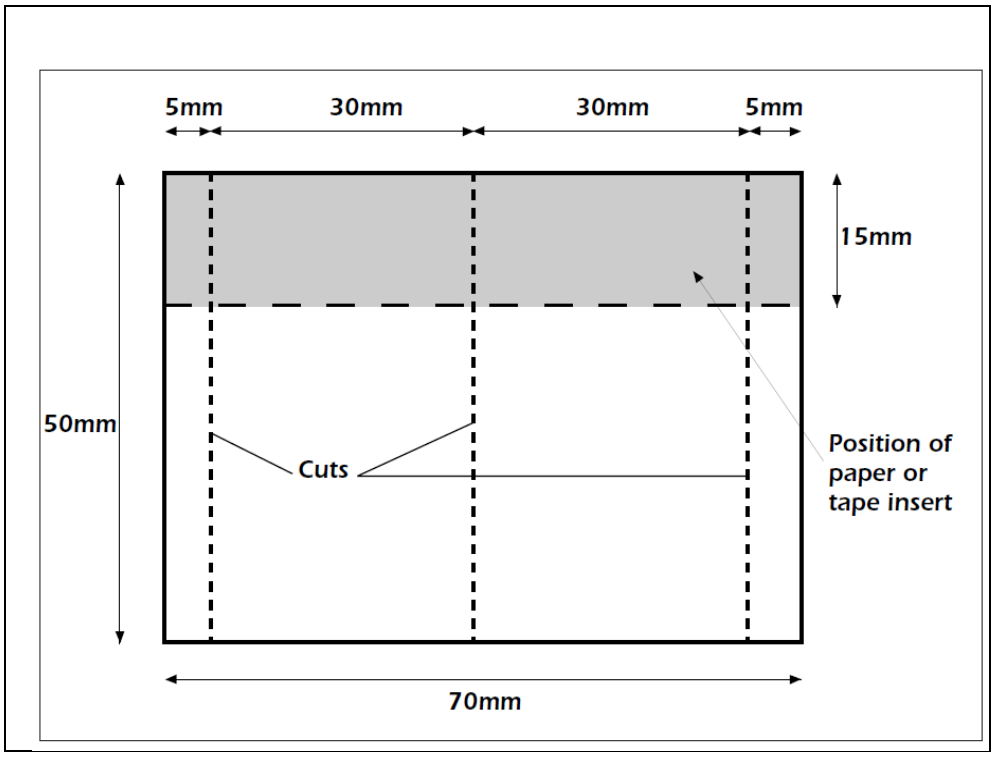

FIG. 4 TEST SPECIMENS ARE TO BE CUT FROM BONDED ASSEMBLY

E-5.11 The rotary disc cutter may be capable of carrying out both operations in one pass.

E-5.12 Adjust the tensile testing machine, firmly clamp one of the free ends of the test specimen into each of the jaws of the tensile testing machine and operate the continous recording force of the tensile testing machine with a jaw separation rate of 100 ± 20 mm/min until either a bonded length of 30mm has been peeled or one of the adherends tears through as shown in Fig 5.

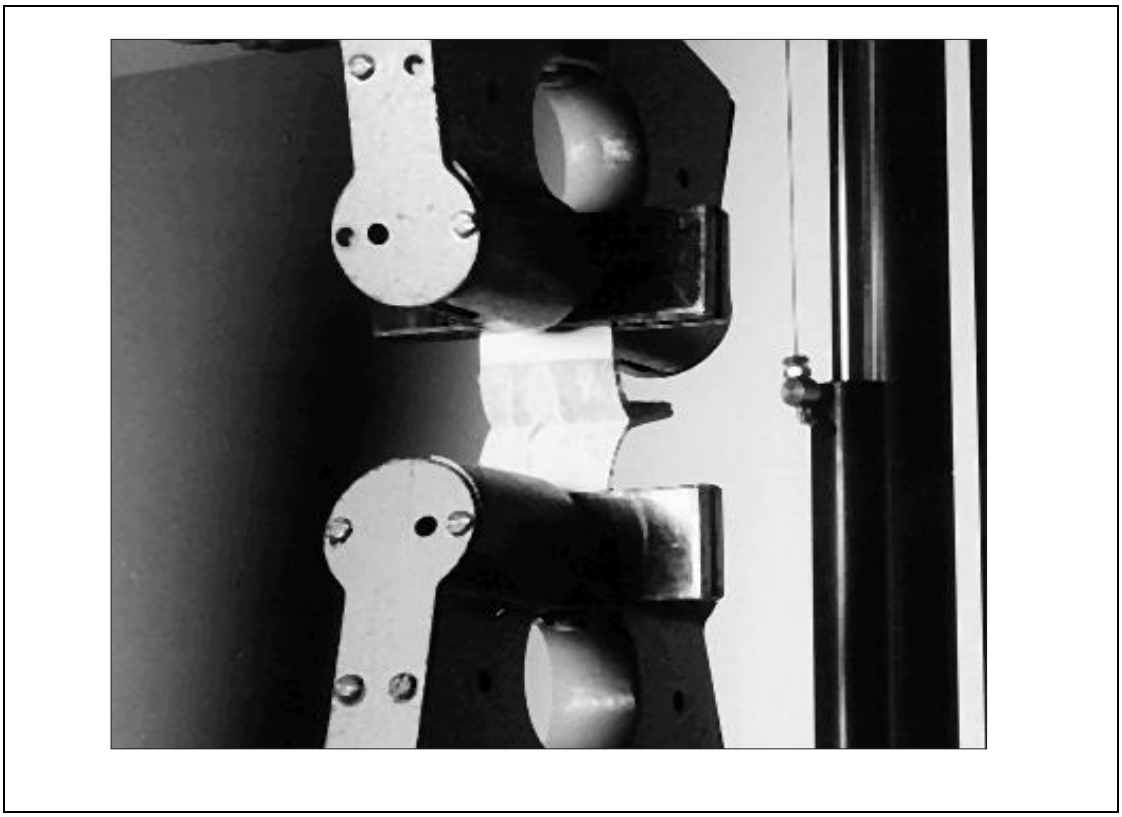

FIG. 5 TESTING OF SURFACE PEEL STRENGTH IN THE TENSILE TESTING MACHINE

E-5.13 As the jaws separate observe the type(s) of bond failure,

E-5.14 For each test specimen divide the average peeling force by the width of the specimen in millimetres, to give the average surface peel strength of each bond in N/mm to the nearest 0.1 N/mm.

Calculate the arithmetic mean surface peel strength for each direction of peeling.

E-6 Test report

a) A description of the material.
b) The arithmetic mean surface peel strength in N/mm for each direction of peeling,
c) Any deviations from this standard test method.